Redwood

National and State Parks

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Department of Parks and Recreation
State of California

2006 HERD UNIT CLASSIFICATION OF ROOSEVELT ELK

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INTRODUCTION

Historically, Roosevelt elk (*Cervus elaphus rooseveltii*) were endemic to the redwood forest ecosystem in northwestern California. Prior to settlement by early American citizens in the 1850's, Roosevelt elk were hunted by the Native Americans, with presumably minimal impact to the elk population. In addition, the Chilula burned the prairies of the Bald Hills regularly, probably in order to make food and plant material gathering easier for the tribe, and promote grass growth to attract wildlife (i.e., elk and deer). However, from 1848 to 1855 market hunting for elk hide and meat to supply gold miners during the northern California gold rush significantly reduced elk populations and distribution (USDI 1983). When the gold rush was over, settlement began and a great deal of elk habitat was burned or logged and converted for ranching cattle and sheep, and crop land use.

The only Roosevelt elk populations that persisted through this period were those occupying coastal lowlands in the northern part of California, where dense forests and brush fields provided protective cover. Mandel and Kitchen (1979) estimated the elk population to be 1,000 to 1,300, with roughly half being located in and around Redwood National and State Parks (RNSP or "park"). RNSP's long-term goal for resource management is to restore and maintain the park's natural ecosystem as it would have evolved without modern human technology. This includes restoring elk herds to pre-settlement numbers and distribution and maintaining the population in equilibrium with the environment, regulated by habitat, predation, inter- and intra-specific competition and natural events.

Annual classification data of Roosevelt elk in Redwood National and State Parks has been undertaken since 1996 (Wallen 1997), in an attempt to document relative abundance and simple population characteristics, such as herd persistence as measured by cow numbers, recruitment and calf survival within known herds. While long term monitoring such as this helps managers understand basic elk population dynamics within the park, it is not intended to replace more detailed investigations and research of the Roosevelt elk population within the park.

METHODS

As with last year, a new methodology was used this year as compared to all previous RNSP elk classification years. Using the suggested methodology described in Weckerly and Francis (2004) (summary in Bensen 2005 - Appendix I), the Bald Hills herd was counted in winter (January) while all the other monitored herds (see below) were counted in the fall (September to November) as they have been during all previous survey years. This recommended change in methodology was discussed in Bensen (2004) and follows Weckerly's (pers. comm.) recommendation based on his population research of the RNSP elk herds over the past ten years (Weckerly and Francis 2004).

Field visits to fall count herd areas from September through November were generally scheduled biweekly, however, some counts were made opportunistically while doing

other field work. The fall elk classification counts concentrated on six identified herd units (see below). Classification counts were performed by driving or hiking to the identified herd units, and also surveying historic and suspected areas where elk have traditionally congregated. Using binoculars and spotting scopes, RNSP staff observers reported the total number of elk observed, and also the total number of elk within each classification group (see below). The observers also assigned an observation ranking criteria value to the classification count, identifying the observer's confidence in the count data (see below). The Bald Hills herd was surveyed by Dr. Floyd Weckerly in January this year and his results are presented with the other herd counts. Other RNSP staff and visitors also opportunistically reported elk counts at known herd units, and elk sightings in lesser or unknown elk use areas. The highest reliable cow count survey was used as the herd size estimate for 2006.

Fall Count Herd Units

(1) **South Operations Center** (SOC) herd
(2) **Lower Redwood Creek** herd
(3) **Davison Ranch**/Berry Glen herd (considered the same herds)
(4) **Elk Prairie**/101 Bypass herd (considered the same herds)
(5) **Gold Bluffs Beach** herd(s); (dispersed, several discrete herds)
(6) **Crescent Beach Education Center** (CBEC) herd

Fall Count Herd Classification Groups

- **Cows** = all females >1 year old.
- **Calves** = young of the year (<1 year old; recognized early by spotted coat and small size; later the spots disappear, but they retain a short, rounded snout.)
- **Spikes** = year old males exhibiting only a main beam, brow tine absent.
- **Mature bulls** = ≥2 years, with brow tine evident off the main beam.

Fall Count Herd Observation Ranking Criteria

1 = Good, visibility good and animals close enough to observe with high confidence accuracy.
2 = Fair, animals are either distant or not fully cooperative for good confidence in classification (e.g. observation time is reduced due to movement into cover).
3 = Poor, animals too far away (e.g. difficult to track individuals or animals are in adjacent hiding cover). Qualify the observation in the notes section.
4 = Unacceptable, bad visibility due to darkness, fog, uncooperative animals.

Counts of the Bald Hills herd (which is made up of a variable number of discrete sub-herds) were made in early January using the methodology described in Weckerly and Francis (2004) (summary in Bensen 2005 - Appendix I). A set transect route was driven/walked once a day for ten surveys days over two weeks. All elk seen were counted and classified into mature bulls (any elk with a brow tine evident off the main beam) and cows (all others, regardless of sex or age) using binoculars and field

telescopes. All discrete sub herds seen during one survey day were lumped into a single number representing the entire Bald Hills herd. As with the other herd counts, the highest reliable cow count survey was used as the year's herd size estimate for 2006.

RESULTS

Classification counts were performed to determine the total number of elk within each herd unit and classification group (Table 1). Cow counts by year, the best indicator of herd persistence (Weckerly and Francis 2004, McCullough et al. 1994) are shown in Table 2. Those data were used to determine ratios of calves/cows (Table 3), and bull/cow ratios. The ratio of calves to cows is an indication of herd productivity.

Table 1. Highest number of elk reported within each herd unit and for each classification grouping in 2006. MB = mature bull, SP = spike, CW = cow, CV = calf, n = total surveys.

Location	MB	SP	CW	CV	Total	n
SOC	3	0	10	3	16	2
Lower Redwood Creek	6	1	22	10	39	3
Bald Hills*	No data	N/A	251	N/A	251	6
Davison Ranch	8	0	16	3	27	5
Elk Prairie	1	0	4	1	6	5
Gold Bluffs Beach	1	0	10	3	14	4
CBEC**	6	2	23	Unknown	31	1

* Only mature bulls were classified, all other elk classifications (spikes, cows, calves) were lumped together under the cow heading as directed by the Weckerly and Francis (2004) (summary in Bensen 2005 – Appendix I) methodology.
**Cows and calves not classified separately, lumped together.

Table 2. Highest reliable (ranking <3) cow counts for identified elk herds, 1996 to 2006.

Location	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
SOC	11	16	14	13	13	9	8	11	10	10	10
Lower Redwood Creek	28	16	26	32	38	31	31	27	18	22	22
Bald Hills	78	45	98	62	104	54	35	26	71	241*	251*
Davison Ranch	38	34	42	31	39	24	29	29	25	17	16
Elk Prairie/ Bypass	25	21	21	15	20	19	9	5	6	5	4
Gold Bluffs Beach	ND	21	33	25	29	26	29	20	16	14	10
CBEC	ND	ND	ND	ND	16	ND	23	ND	ND	30	23

* 2005 and 2006 were the first years the Weckerly and Francis (2004) survey methodology (summary in Bensen 2005 - Appendix I) was utilized and thus the counts from those years are not comparable to any previous survey year.

Figure 1. Selected RNSP elk herd cow numbers from 1996 to 2006 indicating herd persistence through time.

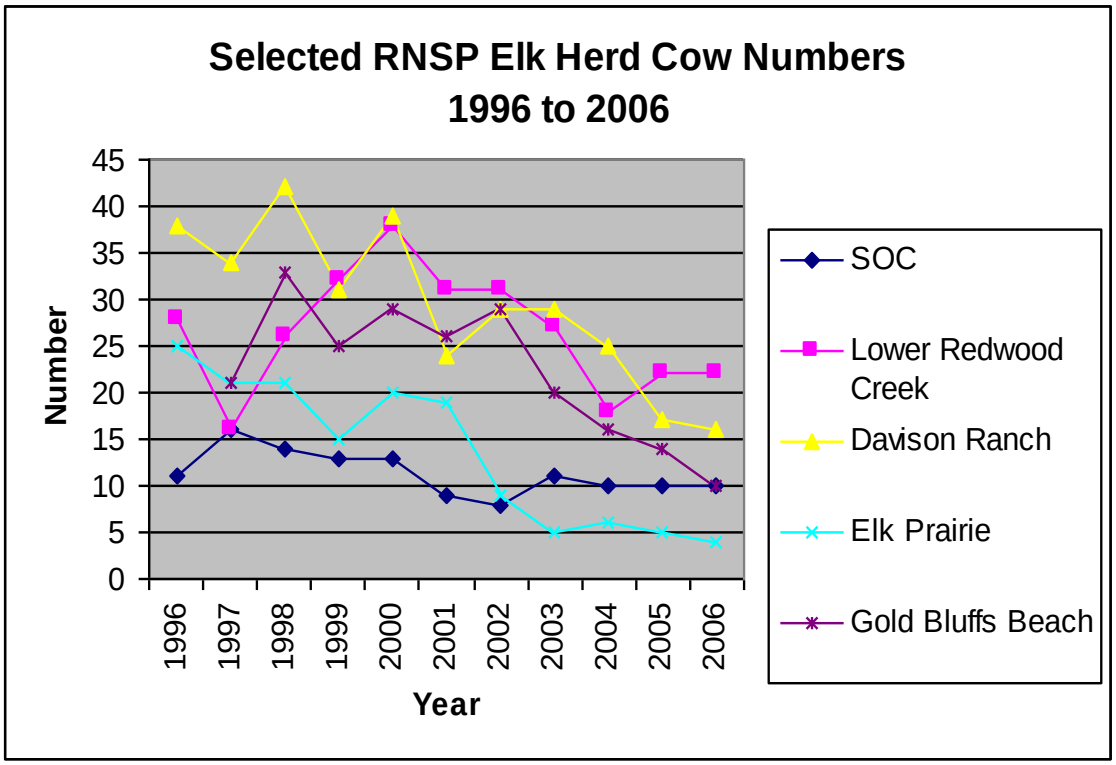

Table 3. Calves per 100 cows for identified elk herds, 1996 to 2006.

Location	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
SOC	45	35	29	31	15	22	36	27	10	40	30
Redwood Creek	39	11	15	38	22	26	22	11	22	18	45
Bald Hills	25	20	32	32	21	19	20	12	4	N/A	N/A
Davison Ranch	23	27	18	23	41	29	21	21	24	12	18
Elk Prairie/ Bypass	8	33	24	53	29	37	33	20	50	0	25
Gold Bluffs Beach	N/A	38	12	7	9	19	21	15	6	17	30
CBEC	N/A	N/A	N/A	N/A	13	N/A	22	N/A	N/A	N/A	N/A

Old South Operations Center (SOC) herd

The number of cows in this herd appears to have remained stable when compared to the past ten years of surveys and to have produced an average number of calves when compared to previous years (Tables 2 and 3). The calf/cow ratio was 0.30. The bull/cow ratio was 0.30, and is slightly lower than most previous years. The highest count for the entire herd was 16.

Lower Redwood Creek herd

The elk in this herd appear to continue to utilize a long corridor of habitat along lower Redwood Creek extending from the confluence of Prairie and Redwood Creeks upstream to the confluence of Cloquet and Redwood Creeks. Elk herds have been seen even farther upstream in previous years, but these sightings may or may not be a separate herd. This herd was not seen temporarily joining the old SOC herd like it did last year. Cow counts were the same as last years but lower than lower than the previous six years' counts (Table 2). The calf/cow ratio was 0.45, the second highest ever documented for an RNSP elk heard (Table 3) and the highest ever for this herd. The bull/cow ratio was 0.27. The highest count for the entire herd was 39.

Bald Hills herd

Elk groups in the Bald Hills continue to appear to be comprised of several discrete herds which have been observed near Ganns Prairie, Elk Camp, Airstrip, Childs Hill, Schoolhouse Peak and Maneze Prairies as well as the Coyote Creek and the Williams Ridge areas. This year's count was significantly higher than in all previous years but last year's due the switch to the Weckerly and Francis (2004) survey methodology. The herd size was slightly larger than last year's (Table 1). Cow/calf ratios cannot be calculated using this method because calves cannot be classified during the winter survey window –

by that time of year calves are indistinguishable from cows at distances of more than 100m (pers. obs.). No bull data was collected this year.

Davison Ranch (Elk Meadow) / Berry Glen herd

Like the old SOC herd, this elk herd is one of the most visible and easily accessible herds in the park. Classification counts were typically conducted under good visibility and the animals were often close enough to observe with a high confidence in accuracy. The herd continues to consist of a group of mature bulls that occupy the northern portion of Elk Meadow north to the Lost Man Creek Hatchery, and a separate group of cows, spikes, and calves that occupy the southern portion of Elk Meadow south to Skunk Cabbage Creek. The highest total count was 27, and the calf/cow ratio was 0.18. The bull/cow ratio was 0.50, with eight mature bulls observed during two of the counts. These numbers are lower than all previous years' counts with a lower number of bulls, continued significant, long term downward trend in the number of cows (Table 2 and Figure 1) and relatively low productivity (Table 3).

Elk Prairie / 101 Bypass herd

Like the Davison Ranch herd, this herd has shrunk to the smallest size ever recorded. The herd may have changed their primary grazing range to the Highway 101 Bypass area and away from Elk Prairie or has actually declined in number. There are a number of spots along the Bypass which are hidden from the highway itself or are unsafe to stop to survey. It is possible that the larger numbers seen in previous survey years still exist in this herd but were simply not seen this year. Extensive opportunistic surveys by RNSP staff, however, have not recorded elk in any numbers along the Highway 101 Bypass in the past three years. In addition, it continues to appear that Elk Prairie is now only being used by one small family group, as evidenced by the near identical classification counts made this year, indicating that the same herd was being counted repeatedly. The highest cow count for this herd was 4, a significant drop compared to years previous to 2002 and the lowest ever (Table 2). The calf/cow ratio was 0.25 (Table 3), but only one calf was produced by the four cows. The bull/cow ratio was 0.25, only one bull was recorded.

Gold Bluff Beach herd

Similar to the Bald Hills herd, the Gold Bluffs Beach herd seems to be comprised of several discrete sub-herds which have been observed from just south of Mussel Point to just north of Carruther's Cove. As with previous years, the most consistent sightings of a large herd occurred near the Ossagon Rocks. The highest number of cows observed in this herd was 10, the lowest cow count ever recorded for this herd and continuing a downward trend for this herd over the past three years (Table 2 and Figure 1). The calf/cow ratio was 0.30, relatively high productivity for this herd (Table 3). The bull/cow ratio was 0.10. Small groups (<5) of elk or elk tracks were sometimes observed south of Major Creek and Mussel Point during plover and beach carcass surveys while small family groups and bachelor male groups continue to be consistently seen near the campground, Boat Creek mouth/marsh near the Fern Canyon parking lot and at the mouth of Espa Creek.

Crescent Beach Education Center (CBEC) herd

Fish and Wildlife branch staff did not survey the CBEC herd. However, some RNSP staff members stationed at CBEC did record elk in the meadows near CBEC when they observed them on an opportunistic basis. Unfortunately, calves were not distinguished from cows by CBEC staff. The overall herd size in 2006 was comparable to previous years. There is some speculation that this herd may be the same herd seen occasionally at the Aubell facility approximately 2.5 miles to the north or that this herd mingles with the elk herd seen near the former mill site on Mill Creek in the California Department of Parks and Recreation (CDPR) acquisition area, approximately 2 miles to the east.

Other

Opportunistic visitor and staff observations were scarce this year, unlike previous years. All elk reported by visitors and staff were from the herds described above or were small numbers of bachelor males found along Redwood Creek up to Bridge Creek.

Opportunistic Mortality Observations

Evidence of elk death caused by poaching and predation, but not vehicle collision, were observed by RNSP staff this year. Two elk were poached in July, one bull and one of unknown sex just across Highway 101 from the Kuchel Visitor Center. A mountain lion was seen feeding on a bull elk carcass near the Davison herd in March (Figure 2). The carcass was in almost the same location as a mountain lion killed elk from last year.

Figure 2. Mountain lion and bull elk carcass just south of Davison Road in Davison Ranch pasture/Elk Meadow in March, 2006.

DISCUSSION

Harper et al (1985) reported that calf/cow ratios for Roosevelt elk in Oregon average 0.39 (range = 0.32 to 0.47). The Oregon estimates were from herd units that were subject to hunting mortality. In a late 1970's RNSP study, Mandel and Kitchen (1979) reported the approximate calf/cow ratio at 0.20. The calf /cow ratios reported for the identified elk herds within RNSP during 2006 ranged widely from 0.18 – 0.45, with 4 herds below 0.35 and two herds not calculated. Overall, RNSP elk productivity appeared to be approximately average when compared to previous years. The one exception was the Lower Redwood Creek herd. It had its most productive year ever. The reason for this one herd's high recruitment is unknown.

Except for the Bald Hills herd (which shifted to a new survey methodology two years ago), the trend in total cow numbers appears to continue to indicate a general flat or declining herd size for all herds. The trend has been occurring for the past four to five years, depending on the herd. The Davison, Elk Prairie and Gold Bluffs herds have more than halved in size over the past six years and are at their lowest levels recorded. The SOC and Lower Redwood Creek herds have remained relatively stable. As stated previously, future monitoring should help to indicate whether this trend is merely a temporary fluctuation or an actual, and permanent, decline. As noted last year, the cause for the decline is unknown and only speculative hypotheses have been considered, including deaths of cows through vehicle collisions, poaching, and predation or a combination of all three. Poaching and predation were observed again this year. It is unlikely that the cause has been due to herd fission because the decline has been steady for a number of years. A herd fission would have been recorded as a rapid, one year decline in a given elk herd's size. Only targeted research will provide a definitive answer but if the steady decline continues for one or two more years, then park managers should seriously consider making this issue a research and management priority.

CONTRIBUTORS

Weckerly, Dr. Floyd "Butch". Assistant Professor. Texas State University, San Marcos, Texas.

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